

PATENT

Atty. Dkt. No. AVAN/000424

LISTING OF CLAIMS:**RECEIVED
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Please amend the claims as follows:

1. (Currently Amended) A ~~stabilised~~ stabilized gain semiconductor optical amplifier including an active waveguide comprising: an amplification medium, extending in longitudinal, lateral and vertical directions, and coupled to a laser oscillation structure, wherein said laser oscillation structure comprises at least two resonant cavities extending in first and second directions which are different from the longitudinal direction of the active waveguide and arranged in such a way as to permit the establishment of laser oscillations having at least two different relaxation oscillation frequencies and wherein said resonant cavities are formed at least in a passive waveguide which is placed below said active waveguide on respective sides of the longitudinal sides of said active waveguide.
2. (Previously Presented) The optical amplifier according to claim 1, wherein said resonant cavities have different optical path lengths.
3. (Previously Presented) The optical amplifier according to claim 1, wherein said resonant cavities are associated with different wavelengths.
4. (Previously Presented) The optical amplifier according to claim 1, wherein said resonant cavities and said active waveguide share at least in part said amplification medium.
5. (Cancelled)
6. (Previously Presented) The optical amplifier according to claim 1, wherein at least one of said resonant cavities comprises a multi-mode interference amplification structure.
7. (Previously Presented) The optical amplifier according to claim 1, wherein said resonant cavities are defined by distributed Bragg reflectors.

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8. - 14. (Cancelled)

Please add the following new claims:

15. (New) A stabilized gain semiconductor optical amplifier including an active waveguide comprising:

an amplification medium extending in a longitudinal, a lateral and a vertical direction;
and

a laser oscillation structure coupled to the amplification medium, the laser oscillation structure comprising at least two resonant cavities extending in first and second directions which are different from the longitudinal direction of the active waveguide and arranged in such a way as to permit the establishment of laser oscillations having at least two different relaxation oscillation frequencies, wherein the resonant cavities are defined by at least two structure members formed on respective sides of the longitudinal sides of the active waveguide, which are parallel to the longitudinal direction, and having at least one forbidden photonic band comprising at least two different reflection directions for a photon wavelength included in the amplification band of the active waveguide.

16. (New) The optical amplifier according to claim 15, wherein each structure member is produced at least in part in an upper layer in which the active waveguide is buried and in a passive waveguide, along the longitudinal edges of the active waveguide.

17. (New) The optical amplifier according to claim 15, wherein each structure member is produced in the active waveguide on respective sides of its longitudinal axis and in a part at least of an upper layer which is placed above the active waveguide and in a passive waveguide, placed below the active waveguide.

18. (New) The optical amplifier according to claim 15, wherein the structure members define substantially a photonic crystal of holes or columns constituting diffracting elements and defining a mesh of the order of the wavelength of the photons in the guided mode flowing in the active waveguide.

19. (New) The optical amplifier according to claim 16, wherein the structure members define substantially a photonic crystal of holes or columns constituting diffracting elements and defining a mesh of the order of the wavelength of the photons in the guided mode flowing in the active waveguide whereby the holes or columns extend substantially parallel to the vertical direction of the active waveguide.

20. (New) The optical amplifier according to claim 18, wherein the photonic crystal is a paving arrangement of substantially contiguous convex polygons and share each of their edges with a single adjacent one.

21. (New) The optical amplifier according to claim 15, wherein each structure member is a diffracting lattice.

22. (New) A stabilized gain semiconductor optical amplifier including an active waveguide comprising:

an amplification medium extending in a longitudinal, a lateral and a vertical direction;

and

a laser oscillation structure coupled to the amplification medium, the laser oscillation structure comprising at least two resonant cavities which are arranged in such a way as to permit the establishment of laser oscillations having at least two different relaxation oscillation frequencies, wherein the at least two resonant cavities are spaced apart from each other and have substantially identical directions, whereby the direction of each resonant cavity is substantially perpendicular to a longitudinal direction of the active waveguide.

23. (New) The optical amplifier according to claim 22, wherein each resonant cavity uses a different portion of the amplification medium.

24. (New) The optical amplifier according to claim 22, wherein the at least two resonant cavities comprise different Bragg lattices.

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25. (New) The optical amplifier according to claim 22, wherein the at least two resonant cavities have different optical path lengths.

26. (New) The optical amplifier according to claim 22, wherein the at least two resonant cavities are substantially parallel.